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ABSTRACT

This paper describes the operation and results of an individualized center funded under an Office of Education grant for the provision of special services to disadvantaged students. This center is designed to apply individualized instructional techniques to remedial, developmental, and general education courses for disadvantaged students enrolled at Bowling Green State University. An outline of program operations is provided, including descriptions of courses, instructional methods used, and services offered in support of instructional activities. The outcomes of program operation are described and student achievement data is provided to document these outcomes. Problems encountered in program development and course implementation are discussed and attempted solutions are described. On the basis of experience and research, it is concluded that individualized instructional techniques tend to result in higher grades and better mastery of subject matter for disadvantaged students. It is suggested that these techniques have considerable potential for application in remedial and developmental instructional settings. (Author)

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PROBLEMS AND POTENTIALS OF INDIVIDUALIZED INSTRUCTION
FOR DISADVANTAGED STUDENTS

Hunter R. Boylan

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PROBLEMS AND POTENTIALS OF INDIVIDUALIZED INSTRUCTION
FOR DISADVANTAGED STUDENTS

By: Hunter R. Boylan*

In September of 1973, the Modular Achievement Learning Center (MALC) was established on the campus of Bowling Green State University. Supported by a U.S. Office of Education Grant for Special Services to Disadvantaged Students, the MALC was to provide a series of basic studies and general education courses utilizing the Personalized System of Instruction developed by Fred S. Keller (1968). It was assumed that this instructional system, with its emphasis on mastery learning and the accommodation of individual learning styles would offer substantial benefits to non-traditional students who suffered from inadequate educational backgrounds.

So far, experience and research has shown that this assumption is valid. Since its origination, the MALC has met many of its educational objectives and, in the process, has survived, expanded, and prospered as an educational innovation. It is no longer simply an experimental program but an integral part of the university's academic services area. Course offerings have undergone considerable growth and refinement and student enrollments have increased substantially (from less than fifty in 1973 to over 600 in 1975-76). Students participating in the program rate it very favorably and indicate that their experiences in it have been among the most positive of their academic careers (Freeman, Boylan, and Evans, 1975). The techniques developed through the MALC have been successful and, as a result, have been adopted in many cases by academic departments for use in their general course offerings.

While the program should not be viewed as a panacea for the variety of problems confronting academically disadvantaged students, the MALC has been successful in many areas. In the process, it has encountered many problems - some of which have yet to be resolved. It is the purpose of this paper to describe the operation of the MALC, to present

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research regarding the program's effect on student performance, and to review the problems encountered in three year's efforts to apply individualized instruction to courses designed to meet the educational needs of academically disadvantaged students.

THE PROGRAM

Originally, the MALC was a semi-autonomous administrative unit reporting to the Director of TRIO Programs on the Bowling Green State University campus. After its first year of operation, however, it became part of a newly created unit - the Developmental Education Program. The Developmental Education Program is the primary vehicle through which the academic needs of disadvantaged students are served. In addition to the MALC, the Developmental Education Program also includes tutorial and academic advising and registration services.

The MALC specializes in the development and teaching of individualized courses in remedial, developmental and general education subject areas. As a result, most of its courses are introductory and the program is generally viewed as a freshmen level experience. The courses offered by the MALC usually conform to the original model for personalized instruction as described by Keller (1968) and Sherman (1974). Occasionally, minor modifications of the model are undertaken in order to accommodate the needs of students, the skills of faculty, or the requirements of the subject matter. Practically all MALC courses feature modular units of instruction, mastery learning, some form of self-pacing, and the use of proctors. These are considered to be essential elements in the design of individualized systems of instruction.

Instructors of MALC classes are regular departmental faculty and all courses are similar in content to other departmental courses and carry full academic credit. Although the instructors are usually assigned to these classes on an "in-load" basis by their departments,

they teach their classes in MALC facilities located in the university library and they participate in MALC course development and in-service training activities. The usual staffing arrangement with academic departments is that, in return for "in-load" assignment of teaching faculty, all Full-Time-Equivalents (FTE's) generated by course activities are credited to the department. Proctors are provided by the Developmental Education Program and MALC staff provide assistance with course development. To date, courses have been designed and implemented in the areas of biology, chemistry, economics, English composition, English literature, German, history, mathematics, political science, psychology, reading, sociology, Spanish, speech, and study skills (see APPENDIX II).

In addition to course offerings, the MALC has also developed academic advising, counseling, and performance monitoring systems to support course activities. Through the Developmental Education Program, incoming freshmen are given a variety of diagnostic tests and the results from these are used to advise students in their selection of MALC courses. Once students are enrolled in these courses, their performance is monitored through weekly attendance and progress reports provided by faculty. On the basis of these, MALC staff provide counseling follow-up where necessary to reduce procrastination, to provide encouragement, and to identify learning problems. At the end of each academic term, performance data from MALC courses is used to advise students in their selection of future courses and to determine whether or not a student should continue in the MALC. The high level of communication between MALC staff and teaching faculty and the resultant performance monitoring, counseling, and follow-up activities are considered to be key elements in the successful operation of the program.

THE RESULTS

While student achievement in the MALC varies from course to course, performance is generally very good. When measured in terms of test

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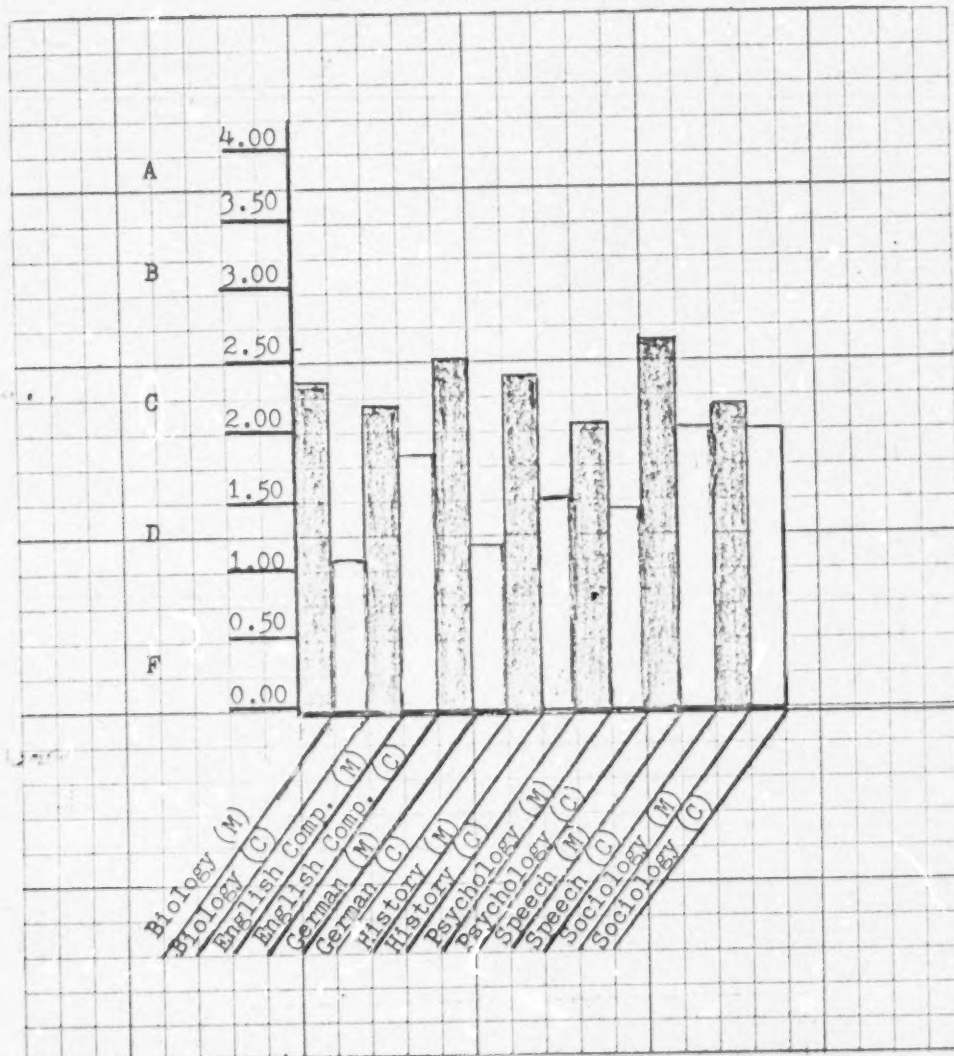
scores and final grades, the performance of academically disadvantaged students in MALC classes is superior to that of similar students enrolled in other, more conventional, sections of the same course. Examples of this are provided in TABLE I for those courses in which comparative data is available.

TABLE I

Average Grades in Selected Courses

M = MALC Classes

C = Conventional Classes



The figures in TABLE I are based on grades obtained by disadvantaged students enrolled in MALC and conventional courses during the 1975-76 academic year. They reflect the average of all grades obtained in MALC sections as compared to grades obtained by students of similar academic backgrounds in conventional sections of the same course. All of the students whose grades are reported had ACT scores of 16 or lower and came from low-income backgrounds. Comparisons were made in those courses where the number of grades available for such students exceeded fifteen in both the MALC and the conventional courses. The numbers of students whose grades are averaged in each course are as follows:

Biology	55 MALC - 49 Conventional
Sociology	42 MALC - 44 Conventional
English	39 MALC - 37 Conventional
Psychology	40 MALC - 29 Conventional
Speech	36 MALC - 29 Conventional
History	16 MALC - 23 Conventional
German	22 MALC - 16 Conventional

Generally, the difference in average grades obtained in MALC and conventional courses is slight. The differences were statistically significant (using the t test at the .10 level of confidence) in only three courses - biology, German, and history. The reported superiority of performance in the individualized sections is, however, consistent with the results cited by other researchers (Cooper and Greiner, 1971, Sheppard and MacDermot, 1970, and Morris and Kimbrell, 1971). It should also be noted that the differences in performance, although slight, were favorable to the MALC sections of all courses.

Since there are often several different sections of the same MALC course taught each quarter and since there is a certain amount of turnover from quarter to quarter among MALC instructors, the differences in

performance cannot be attributed solely to instructor variables. Furthermore, the higher grades in MALC classes cannot be accounted for by the assumption of a more relaxed grading policy in the MALC than in conventional classes. The grading procedures as well as the evaluation measures used are standardized to a certain extent in most introductory courses regardless of whether or not they are taught in the MALC.

Another measure of the MALC's effectiveness is the performance of its students in upper division courses taken after they have completed the MALC experience. The MALC is, primarily, a freshman/sophomore level program and, as a result, most of the courses which it offers are taught at the introductory or 100 level. TABLE II shows a comparison of performance in certain 200 level courses by disadvantaged students who had taken the 100 level course in that subject through the MALC and those who had taken the 100 level course in a conventional setting.

Comparative data is available for only three 200 level subject areas - English, speech, and sociology. This results from the fact that university group requirements may be fulfilled in many areas by taking only one course at the introductory level. Follow-up data is, therefore, available only for those courses that are most popular among disadvantaged students (speech and sociology) or that are required for graduation (200 level English). The comparison of average grades reported in TABLE II is based on the following numbers of students in each category who took both the 100 and the 200 level course during the 1975-76 academic year:

200 level English	33 MALC - 48 Conventional
200 level speech	22 MALC - 39 Conventional
200 level sociology	16 MALC - 21 Conventional

Again, as in TABLE I, the comparison is slightly but consistently favorable to the MALC students. A statistically significant difference in performance (using a *t*-test at the .10 level of confidence) is obtained

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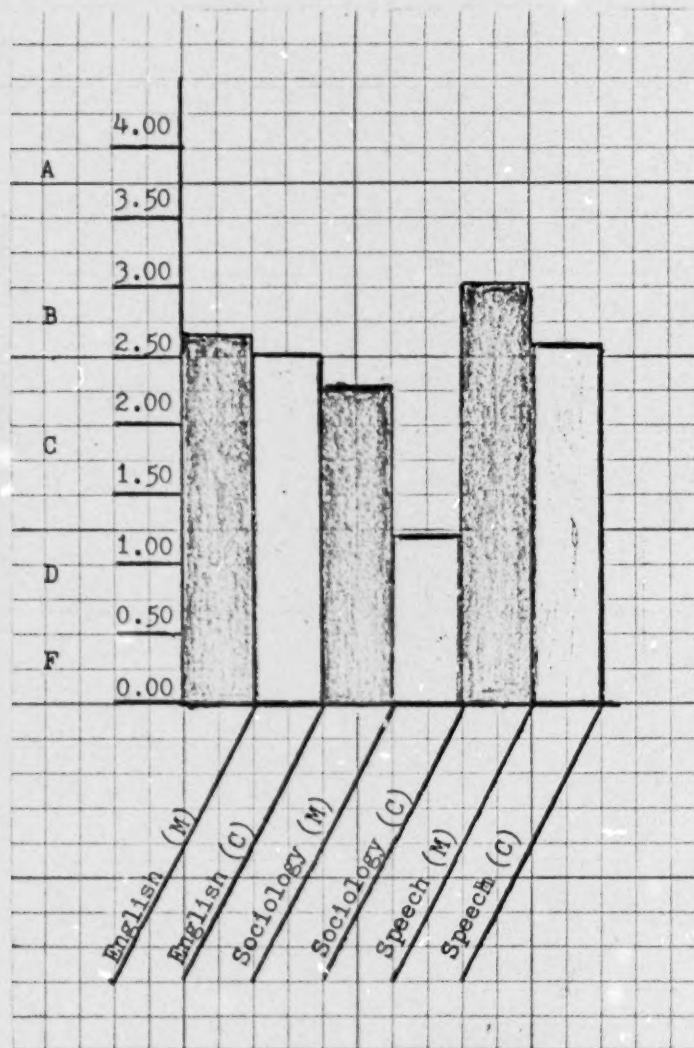
in only one subject area - sociology. The available data does, however, support the contention that MAIC courses do a better job of preparing disadvantaged students for upper division courses in the same subject area than do courses taught using more conventional techniques. It is

TABLE II

Average Grades in Selected 200 Level Courses

(M) = students taking 100 level course in MAIC

(C) = students taking 100 level conventional course

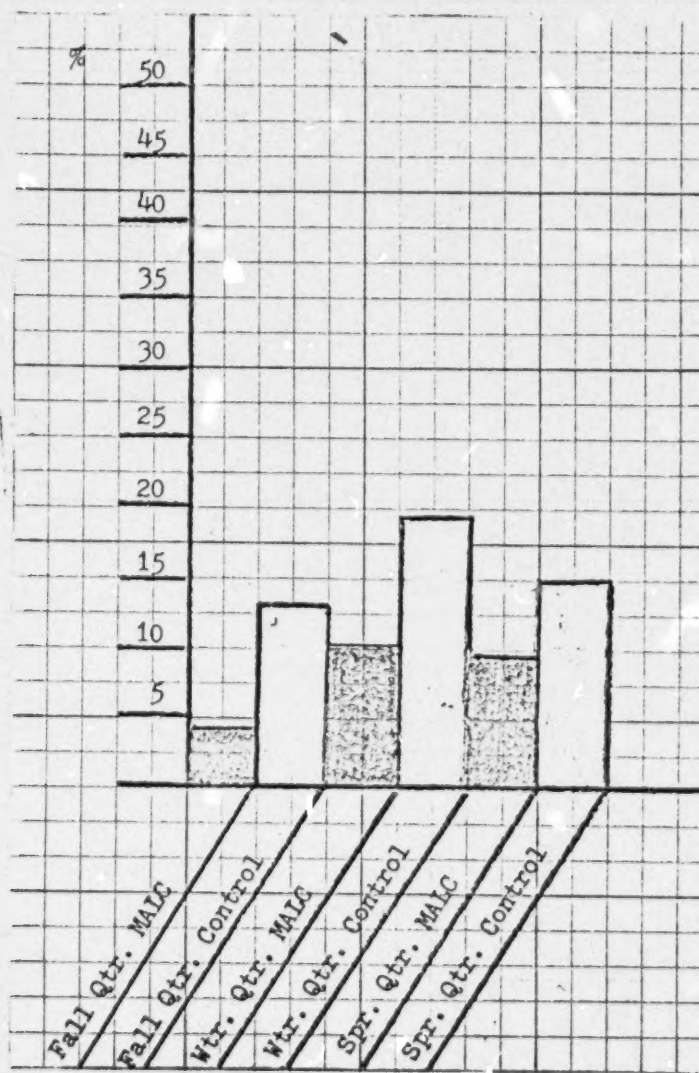


also consistent with the findings of other research suggesting that individualized instruction results in improved retention of subject matter (Cooper and Greiner, 1971) and improved study habits (Taylor, 1976).

The overall academic performance of students enrolled in the MALC also tends to be superior to that of other disadvantaged students who take their courses in a more conventional setting. In a quarterly study conducted during the 1975-76 academic year, failure rates for MALC students were compared with those of similar students who did not participate in the MALC. The results of this study are shown in TABLE III.

TABLE III

Comparison of Failure Rates for MALC and Non-MALC Students



The study was based on the following numbers of student grade reports per quarter:

Fall Quarter 109 MALC - 615 non-MALC

Winter Quarter 104 MALC - 610 non-MALC

Spring Quarter 108 MALC - 540 non-MALC

The MALC students had an average composite of 12.2 on the ACT's and 86% of them were classified as "high financial need" students. The students who took their courses in a more conventional setting had an average ACT composite of 15.5 and 75% of these were classified as "high financial need" students.

In each of the three quarters under consideration, the MALC group had a lower rate of academic failure than did the non-MALC group even though the latter group tended to have slightly better academic and financial backgrounds. Some of this difference may be attributed to the previously noted fact that MALC students tended to receive higher grades in MALC courses. It is rare, however, for students to take all of their courses through the MALC during any given quarter. In fact, the program's official policy is to discourage students from doing this. Typically, a student will take one or two courses of a four or five course load through the MALC. It is unlikely, therefore, that the higher grades obtained in MALC courses would account, entirely, for the difference in academic failure rates. Furthermore, any differences resulting from higher grades obtained in MALC courses should be offset by the fact that the non-MALC group consisted of "better" students as measured by ACT scores.

In general, then, the MALC does appear to have a positive effect on the academic performance of disadvantaged students. Disadvantaged students tend to obtain higher grades in MALC courses than in conventional courses and they tend to perform better in upper division courses than similar students who do not take introductory courses through the MALC. Students who participate in the MALC also tend to have a lower rate of

academic failure than other disadvantaged students. All of this suggests that the individualization of introductory courses helps to reduce the negative effects of inadequate educational backgrounds among disadvantaged students. The techniques utilized by the MALC are, therefore, a viable alternative to the conventional educational experience and a definite asset in the movement toward equal educational opportunity.

THE PROBLEMS

While the MALC has been generally successful, it has encountered a variety of problems in attempting to meet its educational objectives. In many cases, the problems are similar to those experienced by others who have attempted to implement individualized instructional systems. The problem of procrastination, for instance, has been cited on numerous occasions as a major difficulty in individualized courses (Gallup, 1971; Hess, 1971; and Sherman, 1972). As Hess points out (1971), students in individualized courses tend to "...underestimate the amount of work remaining and overestimate the amount of time remaining." The result is either a flurry of test taking activity coupled with poor test performance during the last few weeks of the term or a large number of incompletes at the end of the term.

For MALC students, procrastination is, perhaps, even a greater problem than it is with more traditional students. A major programmatic effort, therefore, has been directed toward the reduction of student procrastination in MALC courses. This effort has been focused in two areas: 1) follow-up counseling and 2) course design. On the basis of weekly progress reports on student performance, graduate and undergraduate "peer counselors" contact students who are not progressing satisfactorily and encourage them to improve their performance. If initial contact does not result in an improved progress rate, a second contact is made and students are asked to complete specified units by a negotiated target date. If students fail to complete the units on time, they are referred to an academic counselor for further action. This action may consist of meetings with the student and his instructor to develop alternative plans for unit

completion, the signing of a contingency contract specifying certain levels of performance as a condition of retention in the course, or the withdrawal of the student from the course on either a WP (withdraw passing) or a WF (withdraw failing) basis.

In addition to the counseling approach, certain features of course design are also used to reduce procrastination. Experience has shown, for instance, that students who begin working with unit materials early in the course and who experience initial success are more likely to make consistent progress. As a result, MALC courses generally have several smaller and easily manageable units of instruction rather than a few larger and more difficult units. Instructors also encourage students to begin completing instructional units as soon as possible.

In designing their courses, faculty are encouraged to specify target dates for the completion of each module. They then emphasize these target dates on a regular basis whenever they have contact with students. A master roster showing student progress in each course is also posted in the MALC office. This specification and charting of progress provides a guide to students in organizing their study activities and provides a baseline of performance for monitoring progress.

Faculty are also encouraged to build various contingencies into their course procedure for failure to perform at specified rates of progress. Such contingencies may range from a limit to the number of tests which may be taken during the latter weeks of the term to the denial of incompletes to students who do not complete at least 60% of the course modules by the end of the term.

Through these methods, the percentage of incompletes obtained in MALC courses has been reduced from 25% in 1974-75 to 14.6% in 1975-76. While this 14.6% figure is considerably lower than has been cited in other studies (Born, 1971; Keller, 1971) where rates of incompletion may run as high as 30-40%, procrastination is still considered to be

a major problem in MALC courses.

Problems have also been encountered with student performance in specific subject areas - most notably English and mathematics. The freshmen English program at Bowling Green State University is a rigorous one, requiring that students meet stipulated levels of writing skills and demonstrate their mastery of English composition on a proficiency test before they can obtain credit for introductory composition courses. In many cases disadvantaged students entering the MALC have such poor preparation in the area of writing skills that it is impossible for them to establish the required level of proficiency in a single academic term. The result is that a substantial percentage of students enrolled in English 111 (the first of two required composition courses) do not pass the course on their first attempt.

The English Department and the MALC have attempted to respond to this problem in several ways. The English 111 classes have been separated into two tracks: English 111 (A) for students with the poorest writing skills and English 111 (B) for students with manageable problems in writing. Students are assigned to these courses on the basis of scores on a written pre-test administered to all students entering the English program. Students assigned to English 111 (A) sections are encouraged to enroll on an S/U basis so that their grade point average will not be effected if they do not pass on their first attempt. Both the English 111 (A) and (B) sections are taught under an individualized instructional system featuring modular units emphasizing various aspects of English composition. The English 111 (A) sections have regular class meetings in addition to individually assigned tutorial sessions. These sessions are considered to be an integral part of the course and attendance is required. Students in both English 111 (A) and (B) sections also have access to the university writing laboratory for additional individual assistance.

All of the university's English 111 (A) sections are taught through

the MALC. Proctors for these sections work within the classroom setting to assist students individually in improving their composition skills by clarifying material and correcting errors in student compositions. Instructors lecture on various aspects of composition for two days each week and supervise proctors in their individual work with students for the other two weekly class meetings.

During the sixth week of the quarter, MALC English 111 students are required to participate in a "mock proficiency" examination. The procedure for this is exactly the same as in the final proficiency examination with students being given two hours to write a theme paper that will be graded for mastery of certain compositional skills. "Mock proficiency" tests are graded on the same basis as the final proficiency test and the results are returned to the students so that they may work on resolving individual problems. The experience of the "mock proficiency" not only provides students with an opportunity to identify problems that they will encounter in their final proficiency examination, but it also helps to reduce the factor of test anxiety as an influence on their final performance.

Prior to the establishment of the MALC, disadvantaged students had a pass rate of less than 40% for English 111 courses. During the first two years of the program's operation, this rate increased to about 55% for students enrolled in the MALC English 111 program. With the addition of the features described above during the 1975-76 academic year, this figure increased to 60% for MALC English 111 courses.

While the MALC has experienced some success in improving the performance of disadvantaged students in introductory English courses, the 60% pass rate currently obtained is not considered to be satisfactory. Continuing efforts are currently being undertaken by MALC staff in conjunction with the English Department in an attempt to improve this situation.

Mathematics is another area in which MALC students experience difficulty. Originally, the MALC offered an intermediate algebra course entitled Mathematics 090. This was a remedial course designed to provide prerequisite knowledge for more advanced courses to students who did not have appropriate mathematics backgrounds from high school.

After two quarters of experience with this course, it was apparent that the mathematics deficiencies of many incoming students were more severe than had been anticipated. Only 20% of the students who enrolled in Mathematics 090 were able to complete its requirements during the ten week academic term. Only 12% more were able to complete the course requirements when given a five week extension.

During the 1974-75 academic year, an extensive analysis of the Mathematics 090 course was undertaken. The conclusions reached as a result of this analysis were that: 1) many entering MALC students had difficulty in performing even the most basic mathematical operations, 2) these difficulties appeared to result from a lack of familiarity with arithmetical manipulation of such things as fractions, decimals, and positive and negative numbers, and 3) previous failures in mathematics courses coupled with lack of familiarity with the subject matter created an aversion to mathematics for many students. Apparently, intermediate algebra, although a remedial course, was too advanced as a starting point for the remediation of mathematical deficiencies.

As a result of this analysis, the MALC redesigned its approach to mathematics instruction. While the Mathematics 090 course was individualized to a substantial degree, it did not provide enough flexibility to respond to the problems of many of the students enrolled. Consequently, another mathematics experience was developed with the assistance of the Mathematics Department and a high school mathematics teacher retained as a consultant.

In this new approach, a series of individual "mini-modules" were

developed which focused on skill development in various areas of arithmetic. These mini-modules were used as subject matter in a tutorial section that met for two hours each week and were included as a laboratory experience for students enrolled in Mathematics 090. Another tutorial section was set up to provide remedial instruction for students who were not yet ready to take Mathematics 090 and an additional section was developed for students beyond the 090 level. This section was used to prepare students for introductory courses at the 120 level of mathematics.

All incoming MALC freshmen were given a diagnostic test in mathematics and, on the basis of their scores, assigned to one of the following curricular sequences:

1. An individualized tutorial in basic arithmetic followed by the Mathematics 090 course
2. An individualized tutorial in basic arithmetic in conjunction with the Mathematics 090 course
3. A Mathematics 090 course followed by an introductory mathematics course
4. An individualized preparational tutorial in basic mathematics followed by an introductory mathematics course
5. An individualized mathematics course with tutorial assistance

This arrangement enabled MALC students to receive specific assistance in resolving individual problems at a level based on their previous background and preparation. It also allowed the MALC to work with students on a continuing basis, unrestricted by the limits of academic terms, until such time as they were prepared to enter mathematics courses at the introductory level.

The approach described above has been reasonably successful during the past two years. Reports from the Mathematics Department indicate that the pass rate for Mathematics 090 has increased to about 60% during the 1975-76 academic year. Academic advisors working with the Developmental Education Program also report that an increased number of disad-

vantaged students are electing to take introductory mathematics courses during the freshman year following their exposure to the MALC mathematics program. The percentage of disadvantaged students obtaining grades of C or better in introductory mathematics courses outside of the MALC has also increased less than 30% in 1973-74 to over 50% for 1975-76.

While the performance of disadvantaged students in remedial and introductory mathematics courses is still less than satisfactory, improvement has been noted. Continuing efforts will be undertaken to refine and develop mathematics offerings and it is anticipated that upper-division mathematics courses will be taught through the MALC during the 1977-78 academic year.

Some of the problems experienced by disadvantaged students enrolled in MALC classes have less to do with course content or design than with the study and reading skills of students. Individualized courses require a certain level of skill in these areas in order for students to be successful. Unfortunately, disadvantaged students do not always possess the study and reading skills required for success in either individualized or conventional courses. Among these students, progress deficiencies attributed to procrastination or lack of motivation are often the result of poor study habits or inadequate reading backgrounds.

For this reason, all students entering the MALC are given a reading and study skills test as part of their pre-admission evaluation. Those who demonstrate deficiencies in these areas are automatically assigned to a reading development and/or study skills course during their first academic term. Both of these courses are taught through the MALC in conjunction with the University Reading Center. Both courses are also individualized and allow students to focus on developing skills in the particular areas where they have deficiencies.

Students assigned to remedial sections of reading or study skills are also scheduled for a relatively light load of classes until such time as their deficiencies have been remediated. In this manner, dis-

advantaged student are given an opportunity to develop their skills at the same time that they are obtaining credits towards a degree.

This approach appears to have been effective during the past two years. Based on reports from MALC faculty, the number of students who fail to make adequate progress in their courses as a result of reading and study skills deficiencies has declined substantially since 1974. This may be due, in part, to a general increase in the academic preparedness of incoming MALC freshmen. The average ACT score for freshmen participating in the program has increased from 11.1 in 1973 to 13.2 for 1976. Nevertheless, the early diagnosis and remediation of reading and study skills problems is considered to be an important factor in preparing disadvantaged students to participate successfully in individualized courses.

SUMMARY AND CONCLUSIONS

The experiences of MALC faculty, staff, and students during the past three years suggest that individualized instruction can be useful in efforts to resolve many of the problems encountered by academically disadvantaged students. The results obtained in the MALC support the findings of others (Austin and Gilbert, 1973; Cross and Semb, 1976) who suggest that low-performing students tend to demonstrate greater mastery in individualized courses.

This mastery also appears to carry over into other courses at the post-introductory level. Disadvantaged students who take introductory courses on an individualized basis appear to perform better in upper-division courses in the same subject area than do similar students who took the introductory course in a conventional setting.

The students who participate in individualized MALC courses tend to obtain higher grades and to perform better, generally, than do students of similar backgrounds who do not participate in the MALC. MALC

students also demonstrate a consistently lower rate of academic failure than do other disadvantaged students. This, too, appears to be consistent with the experience of other practitioners of individualized instruction (McMichael, Brock, and Delong, 1976).

While the MALC has been successful in meeting many of its educational objectives, it has not proven to be a panacea for the variety of difficulties confronting academically disadvantaged students. Procrastination can have negative consequences in individualized courses just as it does in conventional courses. To a certain extent, however, procrastination can be reduced through a combination of thoughtful course design and personal counseling follow-up based on systematic performance monitoring.

Problems in the area of English and mathematics skills, while reduced through the MALC's individualized programs, have not been entirely resolved for many students. Deficiencies in these areas are, perhaps, so severe for large numbers of disadvantaged students that a single course or series of courses will not be sufficient to solve the problem completely. Experience does suggest, however, that individualized approaches can be useful in improving student performance in basic composition and mathematics.

The MALC experience also suggests that deficiencies in reading and study skills have an adverse effect upon disadvantaged students' ability to participate successfully in individualized courses. Individualized reading and study skills development programs can, however, reduce the negative effects of these deficiencies and enable students to take full advantage of individualized courses.

On the basis of three years of experience, it is apparent that individualized instruction can be successfully applied to educational experiences for academically disadvantaged students. The extent of this success is related to a variety of factors that may transcend the limits of course design or organization. It is probably unreasonable to expect

any system of instruction to overcome many of these factors. That fact that there may be limits to the potential of individualized instruction as a means of educating non-traditional students should not overshadow the essential viability of the technique. It is, perhaps, one of the most effective methods currently available for reducing the negative consequences of educationally disadvantaged backgrounds among new and different groups of college students.

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